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THE DECLINE IN THE DEATH RATE, 1901-1910, AND 1910-1920.[1]

The gross death rate from all causes in the original registration States[2] declined from 17.2 per 1,000 in 1900 to 15.6 in 1910 and 13.9 in 1920, a decrease of 9.3 per cent in the first decade and 10.9 per cent in the second decade. If we take into consideration the fact that a secondary but severe epidemic of influenza-pneumonia occurred in the early part of 1920, the indicated decline from 1910 to 1920 is less than it would have been had 1920 been a normal year. In 42 cities in the United States having a population of over 100,000, the excess death rate during the 1920 epidemic period from influenza-pneumonia alone was about 1.13 per 1,000. If the same excess may be presumed to have occurred in these original registration States, the death rate in 1920 would have been approximately 12.8 per 1,000, and the decline from 1910 would have been about 18 per cent.[3]

A comparison of the specific death rates and the expectation of life at various ages for the three periods suggests that, in addition to the accelerated decline in the mortality rate during the decade 1910–1920, some extremely interesting and highly significant changes have taken place. Such a comparison has been made possible in a table recently published by the statistical bureau of the Metropolitan Life Insurance Co. in its Statistical Bulletin for May, 1922. The table is reproduced below.

Death rates per 1,000 and complete expectation of life in original registration States, 1901, 1910, and 1920.

Age.	1901		1910		1920	
	Death rate per 1,000.	Complete expectation of life.	Death rate per 1,000.	Complete expectation of life.	Death rate per 1,000.	Complete expectation of life.
Under 1	124.48	49.24	114.62	51.49	90.11	54.29
5	6.05	54.98	4.66	56.21	4.43	57.19
10	2.67	51.14	2.27	52.15	2.12	53.06
15	3.47	46.81	2.84	47.73	3.13	48.66
20	5.89	42.79	4.68	43.53	4.68	44.54
30	7.97	35.51	6.51	35.70	6.55	36.80
40	10.10	28.34	9.39	28.20	7.94	29.14
50	14.59	21.26	14.37	20.98	12.76	21.54
60	27.02	14.76	28.58	14.42	25.66	14.69
70	56.41	9.30	59.52	9.11	59.48	9.13
80	127.23	5.30	130.28	5.25	128.88	5.32
90	252.95	2.95	249.62	3.03	247.63	3.02
100	453.73	1.58	401.91	1.85	398.70	1.87

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[1] From the Statistical Office, U. S. Public Health Service.

[2] Including Connecticut, Indiana, Maine, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Rhode Island, Vermont, and the District of Columbia.

[3] The death rate in 1900, in fact, was also abnormally high in the area, because of an epidemic of influenza-pneumonia in March and April. The decline of 9.3 per cent from 1900 to 1910, therefore, is an overstatement rather than an understatement of the decrease in causes other than epidemic influenza-pneumonia.

The comparison is more easily made if the differences between the rates at each age and the percentages of decrease or increase are shown, as in the following table.

Increase or decrease in the death rate at specified ages, 1910 over 1901, and 1920 over 1910; in original registration states.

Age.	Increase (+) or decrease (−)				Age.	Increase (+) or decrease (−)			
	Rate per 1,000		Per cent.			Rate per 1,000		Per cent.	
	1910 over 1901.	1920 over 1910.	1910 over 1901.	1920 over 1910.		1910 over 1901.	1920 over 1910.	1910 over 1901.	1920 over 1910.
Under 1	−9.86	−24.51	−7.9	−21.4	50	−.22	−1.61	−1.5	−11.2
5	−1.39	−.23	−23.0	−49.4	60	+1.56	−2.92	+5.8	−10.2
10	−.40	−.15	−15.0	−6.6	70	+3.11	−.04	+5.5	−.1
15	−.63	+.29	−18.2	+10.2	80	+3.05	−1.40	+2.4	−1.1
20	−1.21	....	−20.5	....	90	−3.33	−1.99	−1.3	−.8
30	−1.46	+.04	−18.3	+.6	100	−51.82	−3.21	−11.4	−.8
40	−.71	−1.45	−7.0	−15.4					

Keeping in mind the facts that we are considering a limited area and that changes in the character of the population arising from the flow and ebb of immigration may have been factors influencing the death rates at certain ages, it may be observed that—

1. In the period 1901–1910, there was no decrease in the death rate in the principal older ages, from about 50 to 80, the chief declines being at the ages of 5 to 30. The decrease in the rate among infants under one year of age was only 8 per cent as compared with approximately 20 per cent in childhood, adolescence, and young adult life.

2. In the period 1910–1920, on the other hand, the greatest decline occurred in the death rate among infants and young children. A marked change in the trend of the rate for middle and old age is also evident. Instead of insignificant decreases or actual increases as found in the rate at the ages of 40 and over in the period 1901–1910, the percentage of decrease in the period 1910–1920, was quite definitely significant (10–15 per cent) at the ages of 40, 50, and 60, and only became insignificant at the ages of 70 and 80.

3. The increases in the death rate at the ages of 15 and 30, and the absence of change at the age of 20 in 1920 as compared with 1910, may be accounted for partially by the peculiar age distribution of deaths due to the influenza epidemic in the late winter and early spring of 1920. An accurate estimate of the abnormal mortality at various ages in 1920 is almost impossible, because of the difficulty of establishing a satisfactory normal age distribution for 1920 of influenza-pneumonia deaths, as well as of deaths from certain other causes that apparently increased during the epidemic period. But from such data as we have immediately at hand, the death rate from

influenza-pneumonia alone during the 1920 epidemic was about five times as high as the usual rate from influenza and pneumonia in the age periods "0–14" and "45+," and about twenty times as high as the usual rate in the age period 15–44. It appears certain that had it not been for the epidemic of influenza in 1920, the death rates in that year at the ages of 15, 20, and 30 would have shown a decline over the corresponding rates in 1910. How much of a decrease would have been indicated is at the present time difficult to say.

The changes in the death rates have altered materially the complete expectation of life in 1920 as compared with 1910 and 1901. From the figures prepared by the Bureau of the Census and the Metropolitan Life Insurance Co., have been computed the increases or decreases in the expectation of life in 1910 over 1901 and 1920 over 1910, as shown in the following table.

Increase or decrease in complete expectation of life at specified ages: 1910 over 1901 and 1920 over 1910: Original registration States.

Age.	Increase (+) or decrease (—) in—			Age.	Increase (+) or decrease (—) in—		
	1920 over 1901 (years).	1910 over 1901 (years).	1920 over 1910 (years).		1920 over 1901 (years).	1910 over 1901 (years).	1920 over 1910 (years).
Under 1	+5.05	+2.25	+2.80	50	+.28	—.28	+.56
5	+2.21	+1.23	+.98	60	+.13	—.34	+.27
10	+1.92	+1.01	+.91	70	—.17	—.19	+.02
15	+1.85	+.92	+.93	80	+.02	—.05	+.07
20	+1.75	+.74	+1.01	90	+.07	+.08	—.01
30	+1.29	—.19	+1.10	100	+.29	+.27	+.02
40	+.80	—.14	+.94				

The "expectation of life" tells the story in a better way than do the mortality rates. In 1910, at the ages of 40 to 80 the expectation of life had actually decreased over what it was in 1901. But in 1920, in spite of abnormally high mortality, especially in certain age groups, from the influenza epidemic, there was a gain in the expectation of life over 1910 in practically every age shown.

THE RELATIVE PARASITICIDAL VALUE OF ARSPHENAMINE AND NEOARSPHENAMINE.

WITH A DESCRIPTION OF THE TRYPANOCIDAL TEST.

By Carl Voegtlin, Professor of Pharmacology, and D. W. Miller, Scientific Assistant, United States Public Health Service.

About 12 years have now elapsed since the introduction of arsphenamine and neoarsphenamine as remedies for the treatment of syphilis, and yet no conclusive clinical evidence has been furnished as to whether or not these drugs are of equal effectiveness in curing